

# A LESSON FOR MR. GIBBS

## How the Famous Naval Architect got Up-Staged on his Uptakes

William Francis Gibbs is renowned, revered and remembered, worldwide, as a naval architect of unparalleled talent and accomplishments. His crowning glory, and, fittingly, the culmination of his career, was his masterpiece - the SS UNITED STATES.



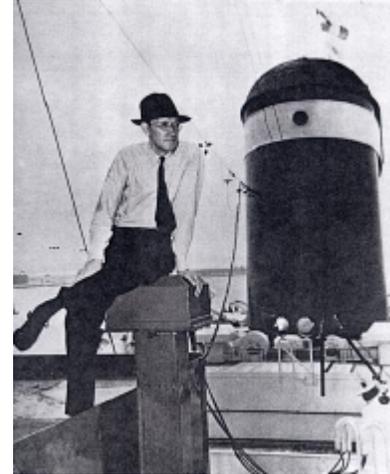
She was ultra sleek, ultra fast and ultra modern when completed in 1952. As she now awaits some hopefully bright new chapter in her life, the Big U's faded and rust streaked profile evokes strong memories of her days of glory. Those who designed her, built her, or sailed in her as either crewmember or passenger undoubtedly remember her massive, twin, streamlined smoke stacks; boldly and brightly painted in the national colors of red, white and blue of the country whose name she carried (and still carries) so proudly.

Those smokestacks are often called Mr. Gibbs' design signature. But their distinctive teardrop shape/sampan top style was not new with the UNITED STATES. Gibbs first used it in the early 30's on the SANTA ROSA and her three sister ships. And then, when designing the liner AMERICA, Gibbs replicated his funnel design of the Santa-class (which apparently had been trouble-free), but made the mistake of lowering them – presumably to follow the art-deco style so popular in those days for ultra streamlining.

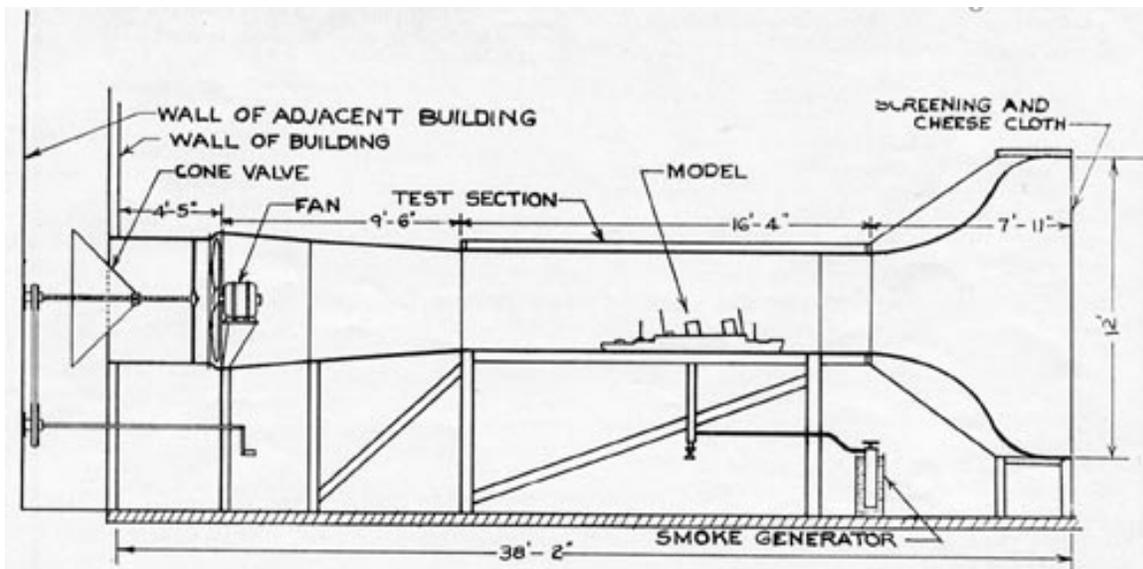
When AMERICA's trials revealed that her exhaust gasses were coating the vessel's aft passenger decks with soot, and fumes were entering her ventilation system intakes, there was no time left before her scheduled delivery to study the problem, so her stacks were hastily raised some fifteen feet. That pretty much solved the problem (at least at high speeds, but it was still a problem at slow speed, and under unfavorable wind conditions).

The result was a ship that looked significantly different from all the models and art work produced up to that time, which left her designer to ponder his mistake.

There must have been a real scramble in the PR department at US Lines about then. Even so, brochures, publicity and even AMERICA's first voyage issue cancellation depicted her with the short stack design. She went out on trials with short stacks, and a little later went into service with taller ones – and very little has ever been written about it. In today's world of sensationalism, that would be headline 'breaking news', accompanied by witch hunting, denials and lawsuits. But in those simpler times, they just solved the problem...and went on. How commendable.



But they didn't forget. Shortly after World War II ended, and in anticipation of building another generation of passenger liners, a series of experiments were conducted in a crude 'wind tunnel' test facility at Newport News Shipbuilding, located in a shed near the main office building. As indicated in the December 1945 issue of the *Shipyards Bulletin*, "Since we already had experience with the AMERICA, we chose her for study, and had built a waterline model, scaled to one-eighth of an inch to the foot."



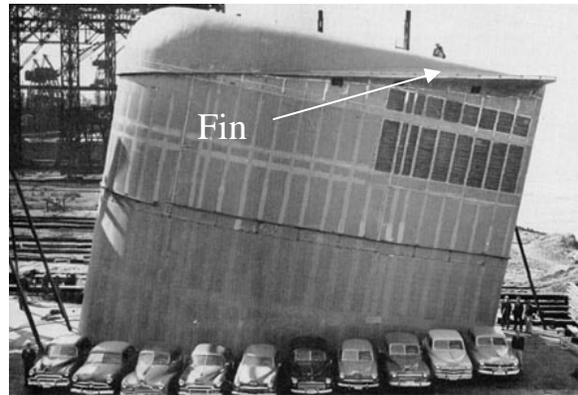
At that time, three methods for reducing smoke nuisance were studied; increasing stack height, making stacks narrower, and increasing smoke velocity. The conclusion resulting from those experiments was that there is no way to guarantee the absence of smoke from decks under all conditions, but that it is possible, with reasonable compromise between appearance, utility and cost to design a ship which will have minimal trouble from smoke.

A few years later, the wind tunnel was reactivated; this time fitted with a ‘working’ model of NNS’ Hull No. 488. The earliest artists’ impressions of the nation’s biggest and fastest passenger liner show her with huge smokestacks; far larger, in proportion to her superstructure, than any of her predecessors. The publicity of that era boasted that her stacks were to be ‘the world’s largest’. Eventually, the final design of the UNITED STATES’ smokestacks resulted in her forward stack, the larger of the two, being over 60 feet long and 55 feet high.

In the summer of 1951, it was reported that months of study with the model in the wind tunnel, using a variety of stack designs and simulating extreme at-sea conditions, had resulted in determining the most efficient design for the ship’s smokestacks. But what wasn’t revealed then – or is generally known today – is how that ‘most efficient design’ came about, or who created it. Like almost everything else about the UNITED STATES, a conditioned public assumed that the subsequent success of the vessel’s smokestacks was yet another example of Mr. Gibbs’ genius.

Certainly, the Big U stacks’ teardrop shape and sampan tops were direct descendents of Gibbs’ 1930’s designs. And the relatively extreme height of her stacks was a result of his experience with AMERICA’s originally squat stacks. But significant difference resulted from the 1951 wind tunnel tests. Gibbs’ prior designs had wing-like ‘fins’ protruding horizontally on either side of the aftermost portion of stacks’ tops; shaped much like aircraft stabilizers. Gibbs had previously arranged such stylish stubs in parallel with his stacks’ stylishly raked stacks. Not so with the UNITED STATES.

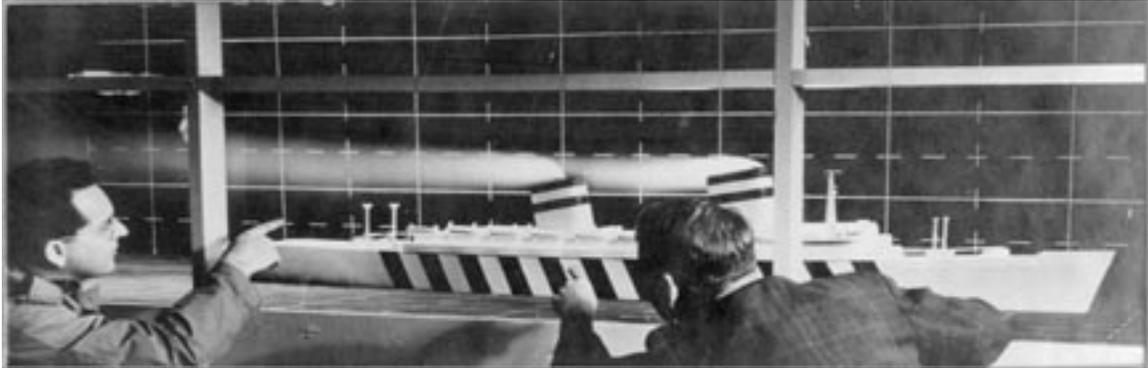
As this publicity shot indicates, the fins of the Big U’s smokestacks were arranged parallel to the ship’s keel and not raked aft, as in all of Gibbs’ previous designs. This seemingly insignificant detail made all the difference. As validated by the UNITED STATES’ trials – and subsequent years of service – smoke fumes exhausted from her stacks were directed upwards and aft by the strong wind currents created at the trailing edge of the now-horizontal fin design. But if not Gibbs’ idea – whose was it?



The unlikely answer: a NNS engineer - and former apprentice – **Howard E. Lee, Jr.**

Like so many other apprentices in the early 40’s, Howard Lee first worked on the waterfront, then in one of the yard’s drawing rooms before he joined the majority of apprentices that entered the military in 1944. Returning in 1946 to complete his time, as part of the huge class of 1947, he left again to attend college on the GI Bill. By 1950, thanks to his apprentice school experience (and some class credits), he had earned a BS in Electrical Engineering, returned to yard and was working in the Engine Technical Department (then housed in the north end of the main office building).

That's him to the left in the following picture; taken during the Big U's smoke model tests. As a result of his teen years' experiences with building and flying model airplane, coupled with a later interest and proficiency in flying small planes himself (often at the grassy airstrip that once paralleled Kecoughtan Road), Howard Lee applied the concept of 'lift' associated with airfoils to shipbuilding.



It proved to be so simple, yet so effective, one wonders why it had not been thought of long before. That thought probably also passed through the mind of a poker-faced William Francis Gibbs the night he witnessed this significant improvement in *his* design.

If so, he said nothing. Howard Lee – who was present when Mr. Gibbs visited the wind tunnel – recalls that the world-famous naval architect only grunted, and walked away without comment.

Days later the men in Engine Tech associated with the wind tunnel work were informed that the experiments were over – and that the smokestack design had been changed on the ship's working drawings to reflect Howard Lee's unheralded accomplishment. He neither received – nor expected – any credit. After all, at the time, he was being paid \$1.50 an hour and results for such a large expenditure of money were routinely expected at Newport News Shipbuilding...

***Bill Lee***

(NNS Apprentice School,  
Class of 1959,  
and proud brother)

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